

Synthesis of oriented thin films of (Sr,Ba)Bi₄Ti₄O₁₅ Aurivillius phases by a metalorganic decomposition method

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The Bi-layered ferroelectrics known as Aurivillius phases have attracted, in the recent years, much interest considering their potential use for non-volatile memory applications in the form of multilayer ferroelectric thin films. These compounds are actually one of the best alternative material for Pb(ZrTi)O₃ (PZT) because, notably, of their better stability against repetitive switching. Nonetheless, the synthesis temperature of such films should be lowered for a good integration in an industrial fabrication process. To this respect, sol-gel or metal-organic decomposition (MOD) methods are interesting since the deposited film usually crystallizes at much lower temperature compare to the other deposition techniques. The second disadvantage of these Bi-layered compounds resides in their strong anisotropy which implies that the effective ferroelectric properties depend strongly upon the orientation of the film.

In this work the preparation of (Sr,Ba)Bi₄Ti₄O₁₅ thin films by a MOD method will be discussed. Respective influence of the thermal annealing condition, the substrate and, generally speaking, the preparation process on the crystallographic orientation of the films will be discussed. Results obtained by in situ thermal X-ray diffraction, scanning electron microscopy, transmission electron microscopy and electrical properties measurements performed on these thin films will be presented and discussed.